 Apple Lisa Computer
Technical Information

Apple Lisa Computer: Bill Atkinson Interview (St. Mac -- February 1984)

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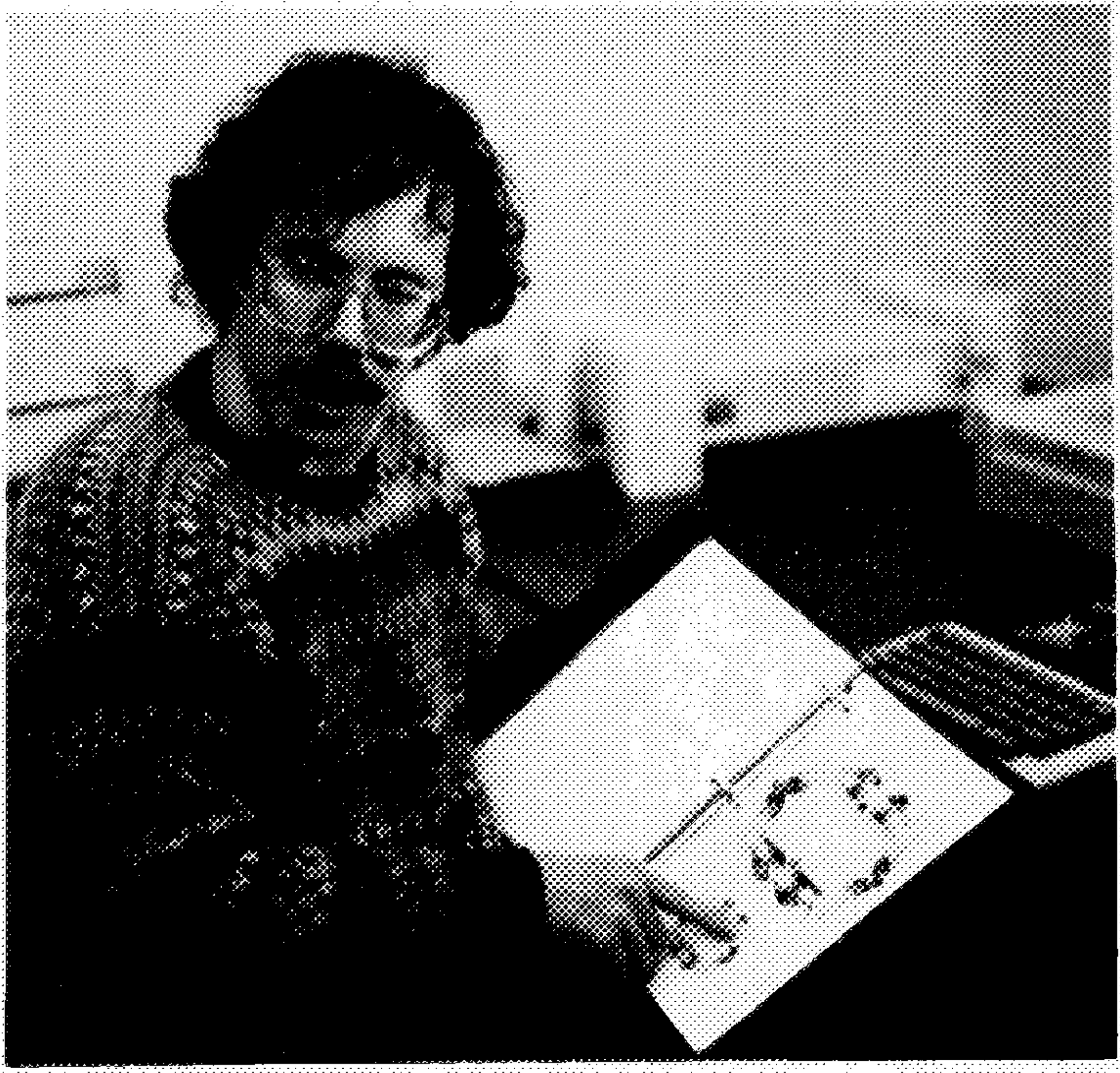
Graphics Wizard Bill Atkinson

QuickDraw's creator considers programming an art.

by Doug Clapp



GRAPHICS WIZARDRY

The Art of BILL ATKINSON

Steve Jobs cared. But not initially. The famous visit to Xerox wasn't Jobs's idea, and Jobs wasn't even convinced that the trip was necessary. Bill Atkinson, with help from Jeff Raskin, talked Jobs into making the visit.

Had the visit not taken place, it's virtually certain that there would have been no Apple Lisa computer, and no Apple Macintosh computer.

Atkinson's persuasion that day was not the first of his accomplishments at Apple. The Atkinson accomplishments began much earlier and still continue. Of Atkinson himself, there is much to say. A bona fide genius, Atkinson is a driven man who admits to having little in his life outside of computer programming, but who doesn't consider himself a programmer.

He considers himself an artist, a sculptor, a man who takes concepts of programming and treats them like clay: shaping and reshaping over and over and over again; powered by will, unwilling to stop until the last limit of invention and speed and compaction has been reached—the machine limit. The hardware limit of the machine. Beyond here, no man can go: The software is as utterly fast as anyone will ever make it for the particular computer it runs on.

There is no conceit in Atkinson's characterization of himself. He speaks quietly of how computers should be. He uses no jargon, no technospeak. He becomes angry only when explaining how computers, even now, make computer users think, "Oh, stupid me."

Atkinson knows that the computers are the stupid ones. He's using his life to change that.

At home, the family room is a computer room. At various times, it's contained four Lisa computers, two Macintosh computers, four Apple II computers, three printers, various 5 1/2-inch disk drives, and eight hard disks, each with a capacity of millions of bytes of storage.

Atkinson began in chemistry, gulped down the field, then moved into neural chemistry: the chemistry of the brain. He began using computers in his studies and became seduced by computer graphics, an amazingly complex field strewn with arcane and difficult mathematical concepts.

A fellow researcher was slicing human brains in an attempt to gain understanding into basic physical structures. Atkinson converted the brain slices into three-dimensional computer graphics and then mapped in structures: what is where in the human brain.

The results were stunning—an achievement in both the field of medicine and the field of computer science. Atkinson's work can be seen on the October 1978 cover of *Scientific American*. The film he produced is now used in more than six hundred medical schools across the country.

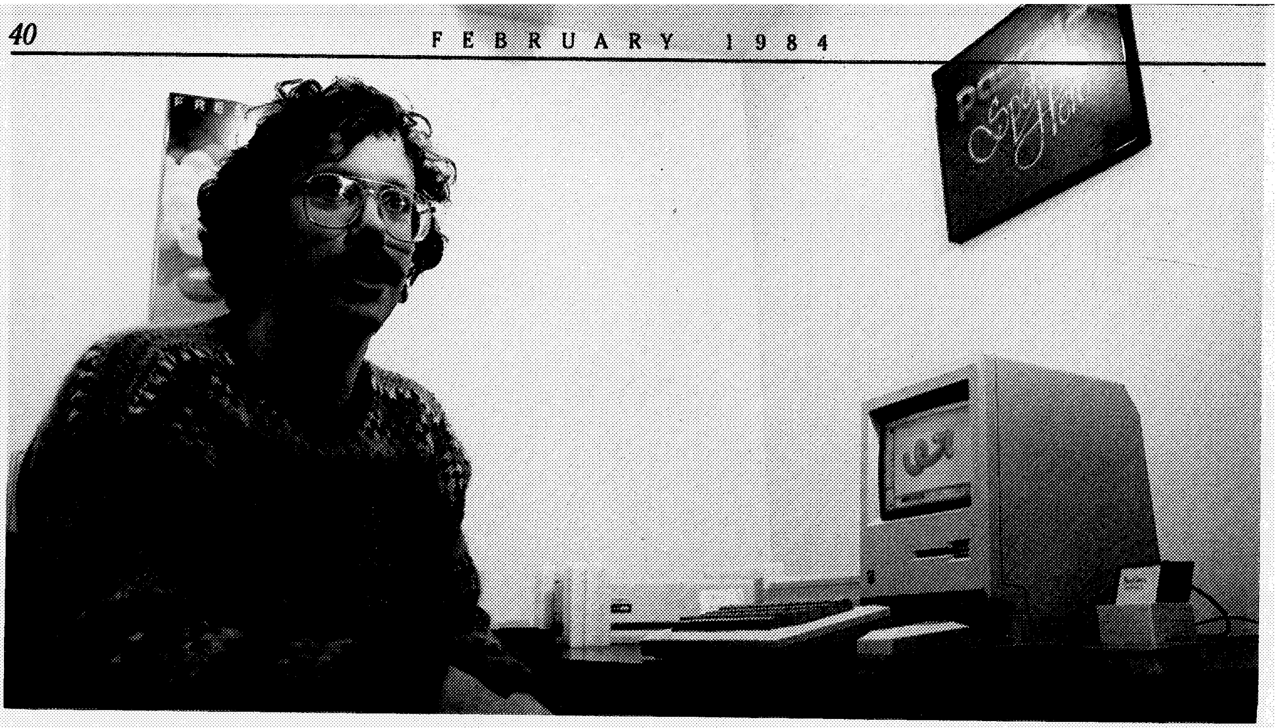
Bill Atkinson is not your ordinary guy.

But the decision had to be made: chemistry or computers. Atkinson chose computers, and founded a company to develop medical computer interfaces for hospitals: Synaptic Systems Corporation.

His life was perfectly in order when, in March of 1978, a friend who had gone to work for a company called Apple gave him a call. A few days later, a pair of plane tickets arrived in the mail.

Atkinson journeyed to Cupertino to find a company that employed thirty people and was already successful in the small-computer field.

by Doug Clapp



Programmer Bill Atkinson, creator of QuickDraw, *feels that there are remarkably few compromises in the Macintosh.*

After all, Apple had actually shipped more than nine hundred machines!

Apple also had Jobs, Wozniak, and something more important: a dream about how computers should be.

Thoroughly seduced, Atkinson stayed—not the first, or the last, to be seduced by dreams, Jobs, Wozniak, or Apple. Apple people had a dream. What they didn't have was a software development problem. Or so they thought. Atkinson thought otherwise. Not believing Basic to be enough, he set out to investigate UCSD Pascal, then under development.

He battled for its inclusion in Apple's marketing plans. He argued with Steve Jobs, who had no use for Pascal. He was rebuffed. Jobs, admittedly, is a tough person to argue with. "Jobs knows when somebody's BS-ing him," Atkinson remembers. "And he also knows when someone isn't."

It ended with Jobs commenting, "Okay, you've got two months to convince me."

Atkinson did, and also convinced Apple's then-president Mike Markkula. "The turning point was when Markkula saw Pascal's screen editor. That did it."

Apple Pascal was a hit; much like *VisiCalc*, it legitimized the Apple as a real computer, one capable of serious tasks.

The Visit

Atkinson kept updated on computer developments. He'd heard about the research at Xerox and convinced Jobs to take the thirty-minute trip to Xerox PARC.

The visit lasted only about an hour. All were amazed. Windows! The future. Jobs was immediately determined to incorporate the Xerox discoveries into Apple products. As always, the Jobs gut feeling was correct.

Atkinson was sure that he could duplicate the Xerox programming efforts. At the top of the list was something called arbitrary region clipping.

Clipping is a computer graphics term. It is something that can be done fast, or done in great detail, but not both at once. Arbitrary region clipping, simply put, is the technique of updating, or writing to, an on-screen window that is partially obscured by one or more overlapping windows. The math necessary had not been discovered to permit both graphic speed and graphic detail when working with regions. Atkinson, getting only a glimpse of the Xerox computers, thought that Xerox had, indeed, discovered the philosopher's stone of graphic computing. And if they could do it, he reasoned, he could do it also.

But they hadn't. Certain aspects of working with regions—graphics of all types: windows, irregular shapes such as polygons and freehand drawings—had eluded the scientists at Xerox. Questions remained: How to overlap windows? How to move them around? How to quickly clip and display the contents of areas underneath, the second they came into view? The problems persisted: determining exactly what was showing on-screen—slivers of several windows?—and ascertaining the size of a given stack of windows, as well as the maximum number of windows that could appear on-screen at any one time.

Atkinson set about duplicating the secret that hadn't been discovered. Six months later—six long, agonizing months pushing at the limits of mathematics—he was closer to discovery, but still the secret escaped his grasp.

The Answer

Fortunately, Atkinson doesn't sleep. At least not sleep as most of us know it. For months, he had kept a dreamlog of his mind's activities during sleep. Now, when he slept, it was a mix of consciousness and unconsciousness: half dreams and half wakefulness. Much like an advanced yogi, Atkinson flowed downward without ever completely losing awareness of self, dreamed, and surfaced again, remembering what had occurred. Even during the night, the intellect persisted; the problems were gnawed at and probed.

The answer came in that twilight between dreams and reality. Atkinson woke himself, fully aware that he had solved the problem at last, and wrote down the secret. Atkinson named the secret *QuickDraw*.

The secret was his alone on the day he got into his car, headed for Apple, and woke up in a hospital bed. He remembers nothing after entering his car. His best guess is that he was thinking, his mind lost somewhere, wrestling with a problem. Or, it might have been a dog in the street, or a child that ran between two cars.

No one knows. What is known is this: The car was traveling at high speed when it hit the rear of a parked semitrailer. The car flew under the semi, the top completely sheared off.

Miraculously, Atkinson survived with only slight physical damage. A more troubling effect of the accident was temporary retrograde amnesia, a condition that wipes out memories of recent events.

When Jobs was notified of the accident, he raced to the hospital. He remained at the bedside until Atkinson regained consciousness.

When Atkinson finally opened his eyes, he looked at Jobs and said, "Don't worry, Steve, I still remember how to do regions."

Atkinson would go on to regain health, with no lasting effects from the accident. The Lisa would be born and Macintosh would follow.

Today, windows can be found on other computers. But there are profound differences between Apple windows and other displays. VisiCorp has *VisiOn*, which manages windows. But the VisiCorp windows are slow and appear as a rough-edged mock-up of the advanced features of Lisa. Microsoft has a window manager that separates the screen into windows. But the Microsoft windows never overlap and never can overlap; as one window is enlarged, others (also shown on screen) must become smaller. The concept is more properly called tiling than windowing.

Microsoft doesn't have the secret. Nor does VisiCorp. Nor does IBM. The secret remains at Apple, in Lisa and in Macintosh.

Apple is now in the final stages of patenting Bill Atkinson's discovery. When they finish, Atkinson has promised to divulge the secret, probably first in the pages of a technical journal concerned with mathematics and computer graphics.

Until then, it remains a secret on display.

Atkinson was rewarded by Apple with the honor of becoming one of the few Apple fellows. Beyond the prestige of the honor comes this: Steve Jobs gives you an envelope. We can assume that the envelope contains riches, but possibly it does not.

No one, however, has ever returned the envelope.

To Come

To casual users, *QuickDraw* receives a showcase in *MacPaint*, a program that Atkinson created on the condition that its functions and appearance would be his, and his alone. It is the creation of one person, and it shows a consistency that is impossible in team efforts. Like all of his programming efforts, Atkinson labored over *MacPaint* through revision after revision, always seeking a maximum of speed and function and smallness.

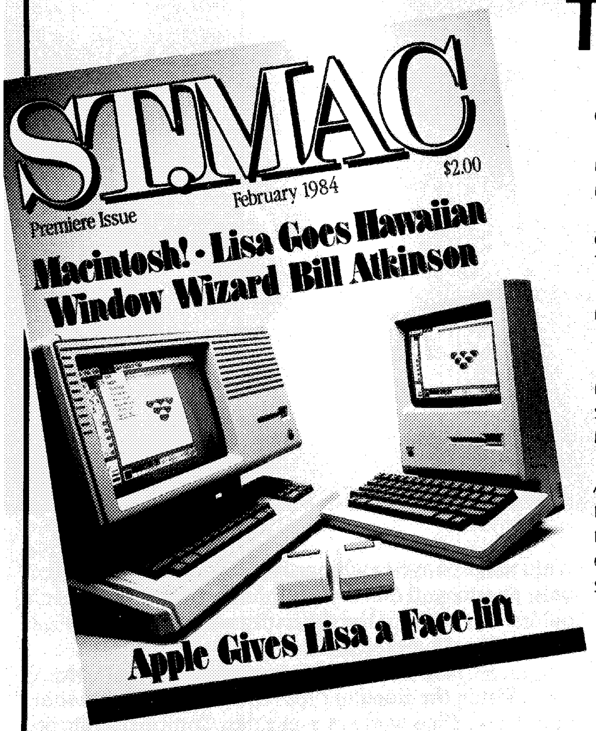
It shows.

Atkinson expects that Mac will be a standard-setter. "The II was the first standard, then the IBM PC, and now the Mac will be the standard for personal computers.

"It's such a neat machine. It's really fun. With some things, you want to do a good job, but you end up having to make compromises. There are remarkably few compromises in Macintosh."

These days, Atkinson works mostly at home, although he has a fully stocked cubicle at Apple alongside the other programmers—programmers with stories of their own and achievements that strain after the accomplishments of Atkinson.

What's next? Again, it is a secret. But guesses can be made, especially in light of this comment: "If I don't do it, some other corporation will. If they do it, they'll screw it up. If I do it, it'll be done right."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